

You Have a Right to Know

In 1983, the Federal Government established the OSHA Hazard Communication Standard. This standard is designed to protect employees who use hazardous materials on the job.

The Hazard Communication Standard states that companies which use hazardous materials must provide their employees with information and training on the proper handling and use of these materials.

You, as an employee, have a Right to Know about the hazardous materials in your work area and the potential effects of these materials upon your safety.

Quick Check

As an employee, you have a "Right to Know" about the hazardous materials in your organization.

1. TRUE

2. FALSE

Key Elements of the OSHA Hazard Communication Standard

The OSHA Hazard Communication Standard is composed of five key elements.

These five key elements are:

1. Materials Inventory - A list of the hazardous materials present in your work area.
2. Material Safety Data Sheets - A detailed description of each hazardous material listed in the Materials Inventory.
3. Labeling - Containers of hazardous materials must have labels which identify the material and warn of its potential hazard to employees.
4. Training - All employees must be trained to identify and handle materials with

The First Step

Hazardous materials (chemical products) are everywhere. It has been estimated that over 100 million chemical products are used by businesses and industry every year. Some of these chemicals pose little danger to you, while others are

Modern manufacturing would not be possible without chemicals. However, like machinery or electrical equipment, you must know how to use chemicals safely.

The first step in using chemicals safely is to identify those materials that may be hazardous to your health or physical safety.

What Do I Need to Know?

Employees often ask themselves the following questions:

1. How can this material hurt me?
2. What can I do to protect myself?
3. Where can I find the answers to the first two questions?

Where to Find the Information You

Your most immediate source for information can be found on labels on containers which hold various hazardous materials.

Your second source of information is Materials Safety Data Sheets. Material Safety Data Sheets will be discussed in the next section.

Quick Check

Information concerning the hazardous materials you work with can be found on container labels and Material Safety Data Sheets?

1. TRUE
2. FALSE



What Must Be Labeled

The OSHA Hazard Communication Standard requires that ALL hazardous chemicals be labeled. Labels must appear either on the container itself, the box, the placard, or the process sheets.

Hazardous chemicals in portable containers which are for the immediate use of the employee who performs the transfer is the exception to this rule.

Quick Check

Only very hazardous materials must be labeled.

1. TRUE

2. FALSE

Basic Label Information

OSHA requires that the following information be included on ALL labels:

1. The product name;
2. A warning statement, message or symbol; and
3. On commercial labels, manufacturers of hazardous materials must include their name and address. Many manufacturers also include a statement of safe handling procedures.

Below is an example of a warning label from a cement thinner

1. A warning statement, message or symbol
2. The product name
3. Safe handling procedures
4. Manufacturer's name and address

WARNING - MAY PRODUCE
DAMAGE
TO CENTRAL AND PERIPHERAL
NERVOUS SYSTEMS BY SKIN
CONTACT
OR BY INHALING VAPORS.
CONTAINS
n-HEXANE (CAS110-54-3).

Avoid inhaling vapors or skin contact.
Use
only in a well ventilated area. When
using, do
not eat, drink or smoke. If
swallowed, do
NOT induce vomiting. CALL
PHYSICIAN
IMMEDIATELY.

ABC Rubber Cement Company.
Altonia, Ill.

Quick Check

Does the label to the right contain all of the required information for a commercial label?

1. Yes

2. No

ISOPROPYL ALCOHOL

FLAMMABLE - KEEP AWAY FROM
FIRE AND FLAME.

WARNING - FOR EXTERNAL USE
ONLY. IF TAKEN INTERNALLY,
SERIOUS GASTRIC DISTURBANCE
WILL RESULT. IN CASE OF
ACCIDENTAL INGESTION, CALL
PHYSICIAN IMMEDIATELY.

Key Words

As you read labels, you will see key words which signal you that you need to take extra care when handling a particular hazardous material. These key words are:

CAUTION

MODERATE RISK

WARNING

DANGER

SERIOUS RISK

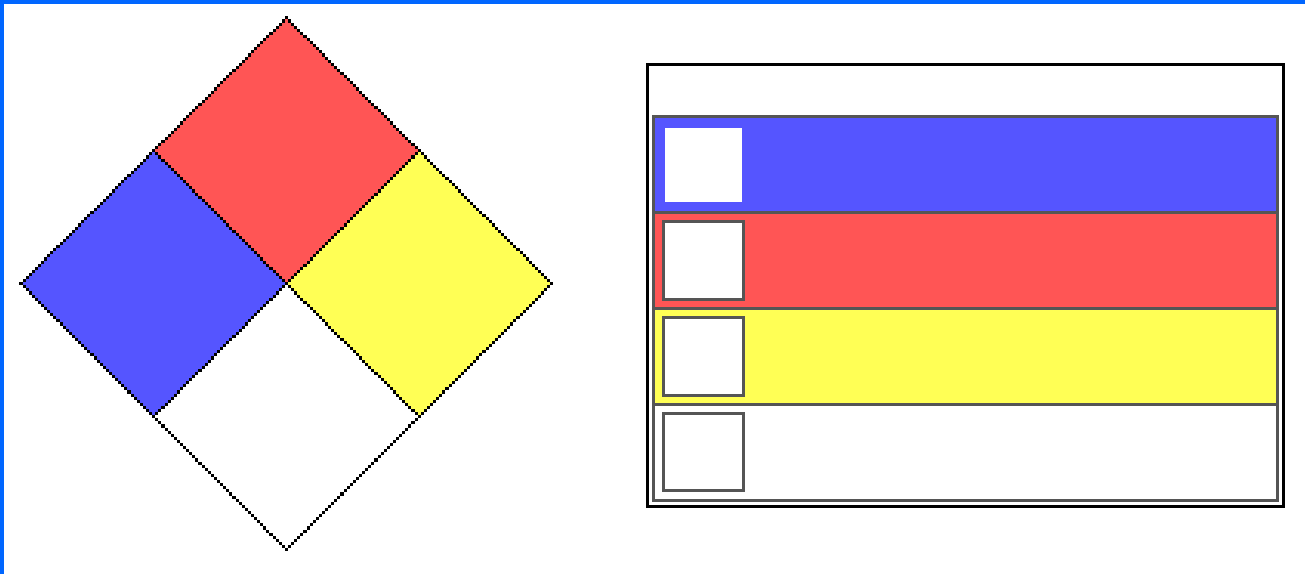
MAJOR RISK

For example, the key word "DANGER" means:

1. Protective equipment and/or clothing is required before use;
2. Misuse can result in immediate harm, long term effects, or death;
3. The chemical may be toxic, corrosive, or flammable.

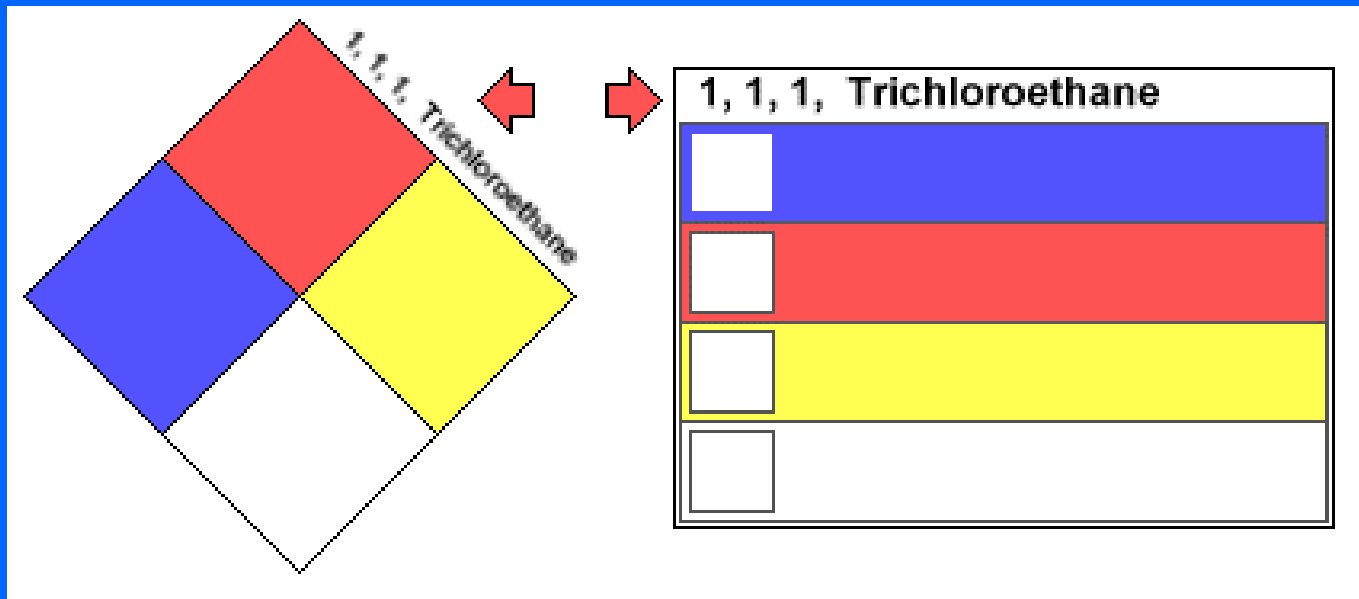
Plant Labels

In addition to commercial labels, many organizations use labels such as the ones shown below. Or, your organization may use a specially designed label which contains the same information. Contact your supervisor for more information about the labels used by your organization.



Chemical Name

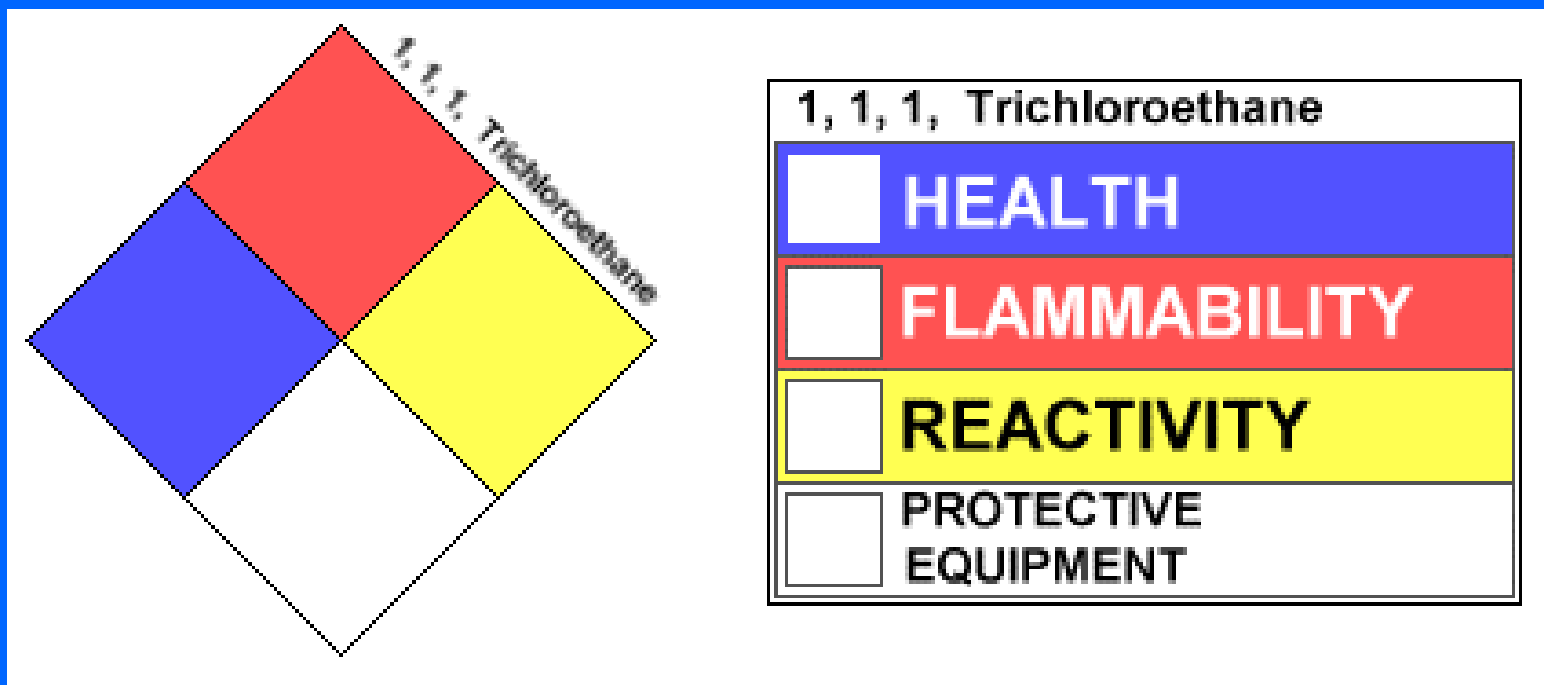
Toward the top of the label will be the chemical trade name of material.



Hazard Class

Each colored bar or small diamond represents a different class of hazard. The hazard classes found on labels include Health, Flammability, Reactivity, Environmental Hazards, and Special Hazards.

Each hazard class uses a different color and a rating scale from 0 - 4.

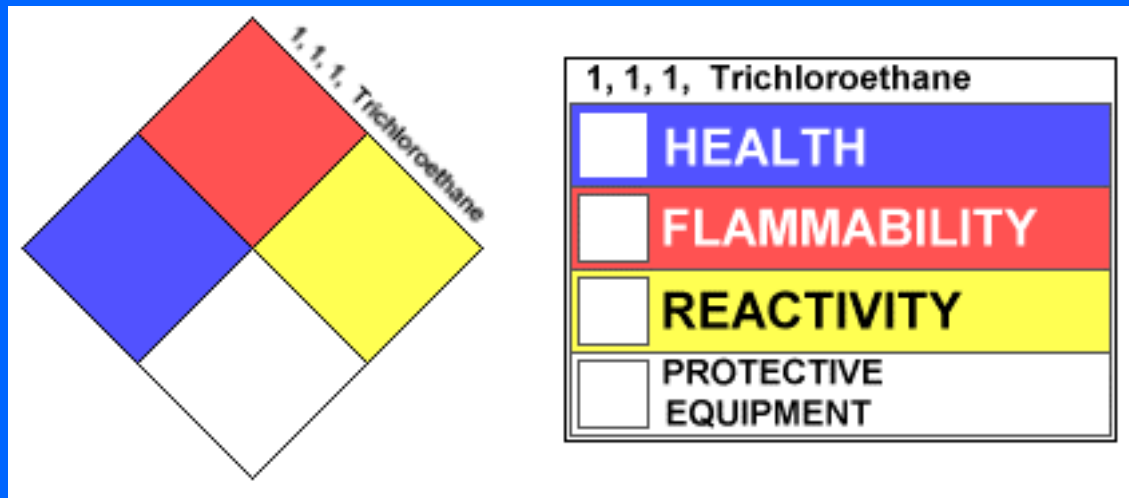


Health Hazards

The first hazard class is Health Hazards. This hazard class is colored blue.

The rating scale for Health Hazards is listed below:

- 0 - No Hazard
- 1 - Slight Hazard
- 2 - Dangerous
- 3 - Extreme Danger
- 4 - Deadly



Flammability Hazards

The second hazard class is Flammability Hazards. This hazard class is labeled with the hazard label **RED**.

The rating scale for flammability hazards is based on the flash point. The flash point is the temperature at which the material gives off enough vapor to sustain ignition.

0 - Will Not Burn

1 - Ignites Above 200 Degrees Fahrenheit

2 - Ignites Below 200 Degrees Fahrenheit

3 - Ignites Below 100 Degrees Fahrenheit

4 - Ignites Below 73 Degrees Fahrenheit

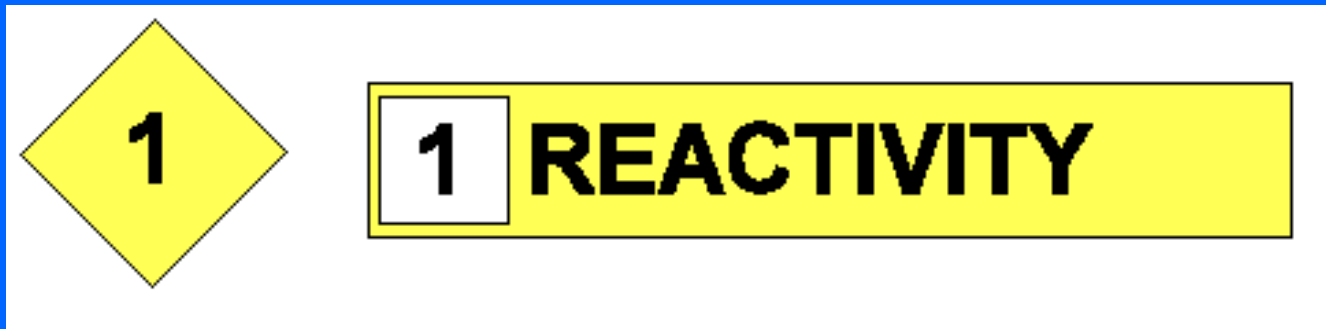


Reactivity

The third hazard class is the Reactivity of the material. This hazard class is represented by a YELLOW diamond.

The rating scale for Reactivity is listed below:

- 0 - Stable
- 1 - Normally Stable
- 2 - Unstable
- 3 - Explosive
- 4 - May Detonate



Special Hazards

Diamond shaped labels include a fourth hazard class called Special hazard class is colored WHITE.

These special hazards are represented by the following symbols:



- Water Reactive

OX - Oxidizer



- Radioactive

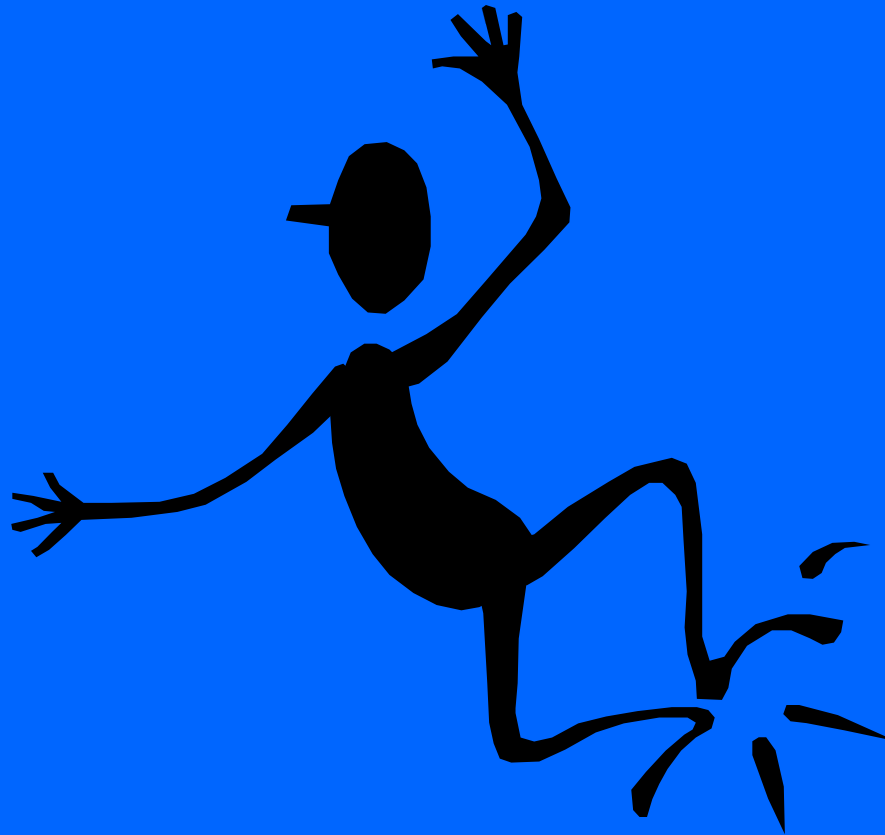
COR - Corrosive

ACD - Acid

ALK - Alkali



**You have completed the Labeling section of
Communication course.**



Material Safety Data Sheet

While labels are an effective way to display information about hazardous materials, there will be times when you will want more information than can be provided on a label.

You can find additional information about the hazardous materials you are using what is called a Material Safety Data Sheet, or MSDS for short. You should take the time to read and understand the MSDSs describing the hazardous materials in your work area.

What is an MSDS?

A Material Safety Data Sheet (MSDS) provides detailed information on hazardous material. An MSDS contains the following information:

- Identity (name of substance)
- Physical Hazards (target organ)
- Health Hazards
- Routes of Body Entry
- Permissible Exposure Limits (PEL)
- Carcinogenic Factors (cancer causing)
- Safe-Handling Procedures
- Data of Sheet Preparation
- Control Measures (personal protective equipment)
- Emergency First Aid Procedures (emergency telephone number)
- Contact Information (for the preparer of the sheet)
- Special Instructions

Sample MSDS Page - Nitric Acid,

This is a sample page from the MSDS for Nitric Acid, 70 percent. The product is made by the ABC Rubber Company, Science Products Division, P.O. Box 123, Altonia, Illinois 40361. Effective date is 8-21-85.

Product identification, synonyms, other names for nitric acid are: aqua azotic acid, nitric acid 70 percent. Formula HNO_3 CAS Number 7697-37-2 molecular weight 63.00. Hazardous ingredients, not applicable. Chemical formula

Precautionary measures, danger, strong oxidizer, contact with other materials may cause fire. Causes severe burns, may be fatal if swallowed. Harmful if inhaled. Do not get in eyes, on skin, or on clothing. Avoid breathing mist, use only in well-adequate ventilation. Wash thoroughly after handling. Do not store near combustible materials. Store in a tightly closed container. Remove and dispose of contaminated clothing properly.

Quick Check

Material Safety Data Sheets (MSDSs) contain the following

1. Emergency First Aid Procedures
2. Carcinogenic Factors
3. Contact Information
4. All of the above



What Materials Have MSD

Material Safety Data Sheets are available for ALL of the hazardous materials present in your work area.

Quick Check

Material Safety Data Sheets are NOT available for all of the hazardous materials present in your work area.

1. True

2. False

When Do You Use an MSDS



You should use an MSDS whenever you need additional information about a hazardous material that is not included on the product label.

For example, you have spilled nitric acid on the floor, and you need to know how to clean it up safely. You need only refer to the "Safe-Handling Procedures" section of the nitric acid MSDS.

Safe-Handling Procedures Section - Nitric Acid

The Safe-Handling Procedures section of the Nitric Acid MSDS provides the

following information:
Isolate or enclose the area of the leak or spill. Clean-up personnel should

wear protective clothing and respiratory equipment suitable for toxic or corrosive fluids or vapors.

For small spills:

Flush with water, and neutralize with alkaline material (soda ash, lime, et cetera). Sewer with excess water.

For larger spills and lot sizes:

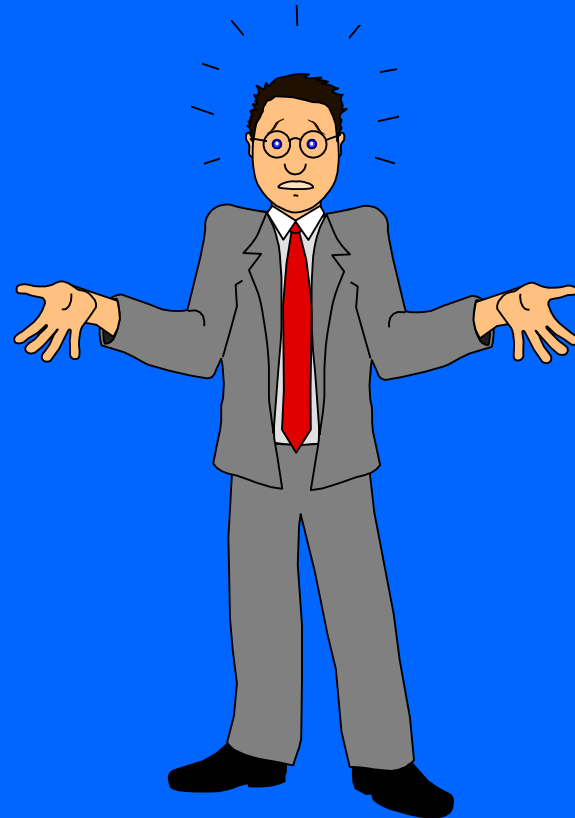
Neutralize with alkaline, pick up with absorbent material (sand, earth, vermiculite) and dispose in a RCRA - approved waste facility or sewer the neutralized slurry with excess water if local ordinances allow.

Quick Check

You should use an MSDS whenever you need additional information about hazardous material that is not included on the product label.

1. True

2. False



When Do You Use an MSDS

Some chemicals, such as sodium hydroxide, are very dangerous. If you have an accident, you may not have time to look up the information you need in an MSDS. You should read the MSDSs for the hazardous materials present in your work area before you work with them.



Quick Check

Material Safety Data Sheets (MSDSs) should be referred to whenever information is needed on any hazardous material.

1. True
2. False



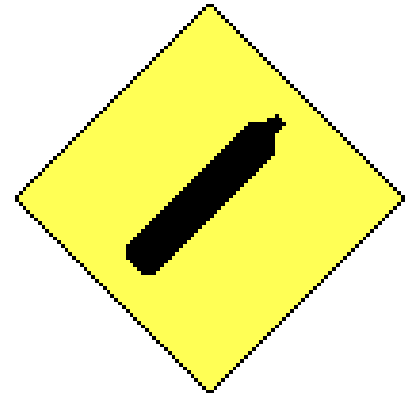
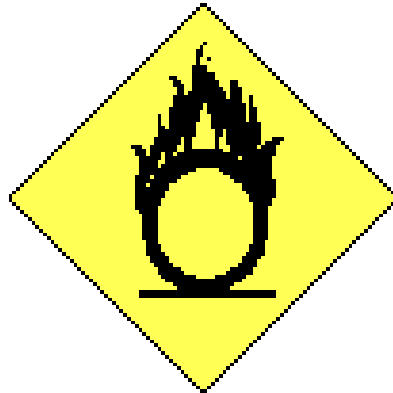
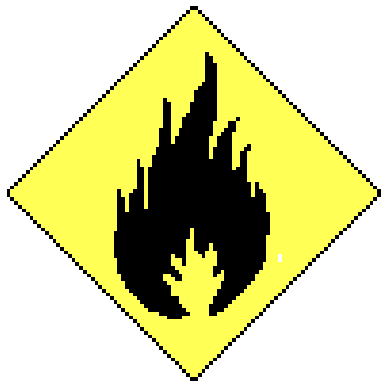
How to Find an MSDS

Ask your supervisor or manager where MSDSs are located. Take time to review MSDSs which describe the hazardous materials present in your work area. Remember, knowing where MSDSs are located and how to use them is your responsibility; it is part of your job.

**You have completed the Material Safety Data
of the Hazard Communication cours**

Physical Hazards

Physical Hazards are one of two major classes of hazardous materials under the OSHA Communication Standard. The other major hazard class is Health Hazards. In this session, we will be looking at various types of physical hazards and what you need to know to use these materials safely. To help you identify which are physical hazards, the symbols shown below are often used.



What is a Physical Hazard

Physical hazards are those substances which threaten your physical health
most common types of physical hazards are:

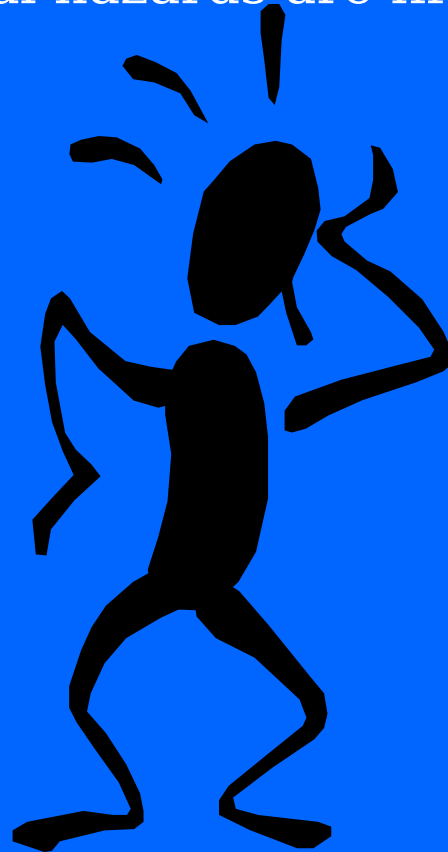
- * **Fire**
- * **Explosion**
- * **Chemical Reactivity**

Quick Check

The most common types of physical hazards are fire, inhalation, and reactivity.

1. True

2. False



Materials Which Use the Fire

There are three classes of materials which use the fire symbol.



1. Flammables can be gases, liquids or solids. Flammables ignite easily and burn rapidly. Liquid flammables have a flashpoint below 100 degrees Fahrenheit.
2. Combustibles are similar to flammables but they do not ignite as easily. Liquid combustibles have a flash point above 100 degrees Fahrenheit.
3. Pyrophoric, or spontaneous combustible materials, burst into flames "on their own" at temperatures below 130 degrees Fahrenheit.

Working with Materials That Use the F

Whenever you work with a material that uses the fire

symbol, be sure to read the warning label and the MSDS for safe handling procedures. With flammables,

combustibles, and pyrophorics, do not expose these materials to sparks, flames or other heat sources.

You

must also keep a fire extinguisher nearby and do not match or flame near them.

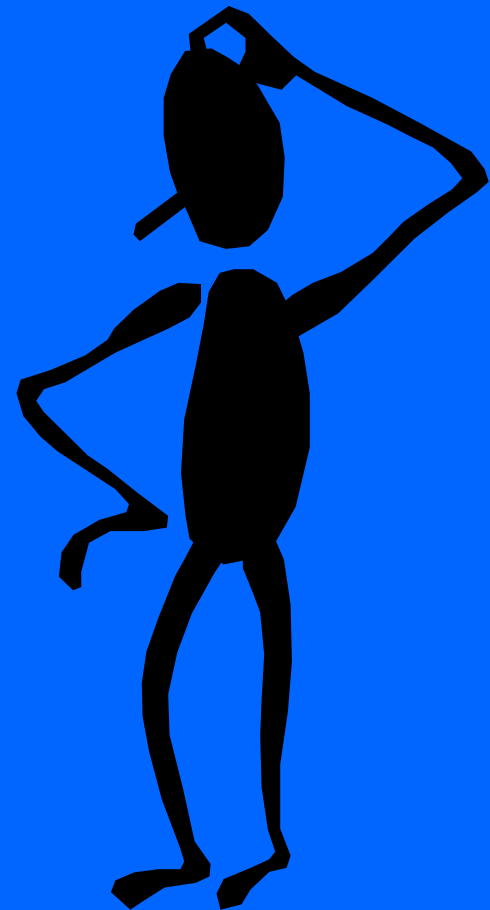


Quick Check

Liquid flammables ignite more easily than do liquid com

1. True

2. False



Materials That Use the Explosive S

1. Explosives are materials which release a tremendous amount of energy in the form of heat, light and expanding pressure within a very short period of time.

2. Water Reactives react with water and may explode, or they may release a gas which is flammable.

3. Unstable Reactives are chemicals that may react or can become self-reactive when subjected to shock, pressure or temperature.



Working with Materials That Use the Explosive

Whenever you work with a material that uses the explosive symbol, be sure to read the warning label or the MSDS for safe handling procedures.

Because materials that use the explosive symbol are often very dangerous to work with, you may need additional training or instructions from your supervisor. Always check with your supervisor before handling or using materials that use the explosive symbol.



Quick Check

Which of the following material classes should NOT use an Explosive

1. Explosives
2. Flammables
3. Water Reactives
4. Unstable Reactives



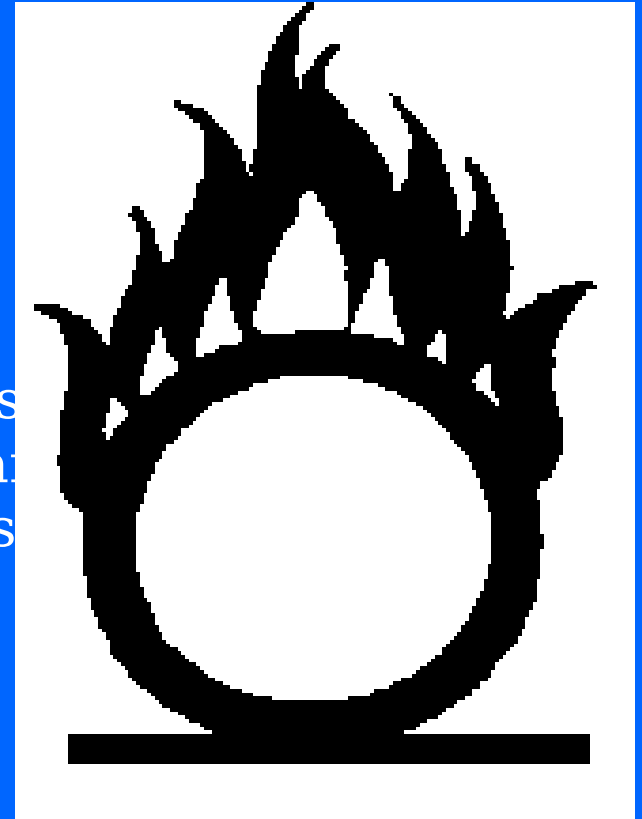
Materials That Use the Flaming "O"

1. Oxidizers cause other substances to burn more easily through a chemical reaction or change.
2. Organic Peroxides contain oxygen and act as powerful oxidizers.



Working with Materials That Use the Flaming "O"

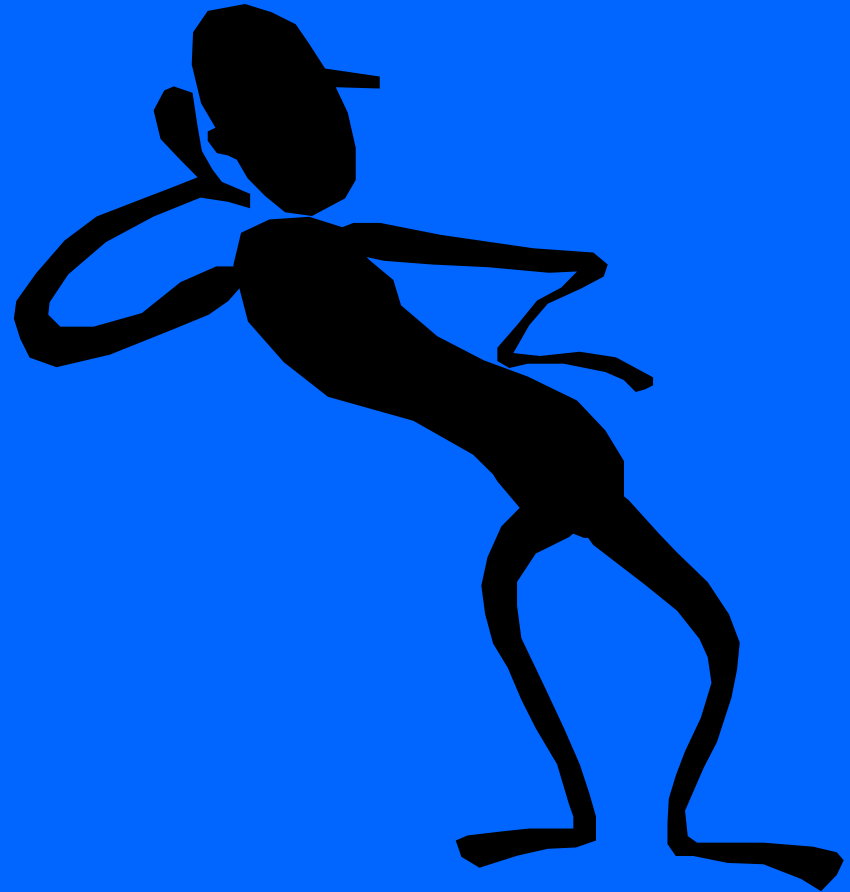
Whenever you work with a material that uses the Flaming "O" symbol, be sure to read the warning labels and the MSDS for safe handling procedures.



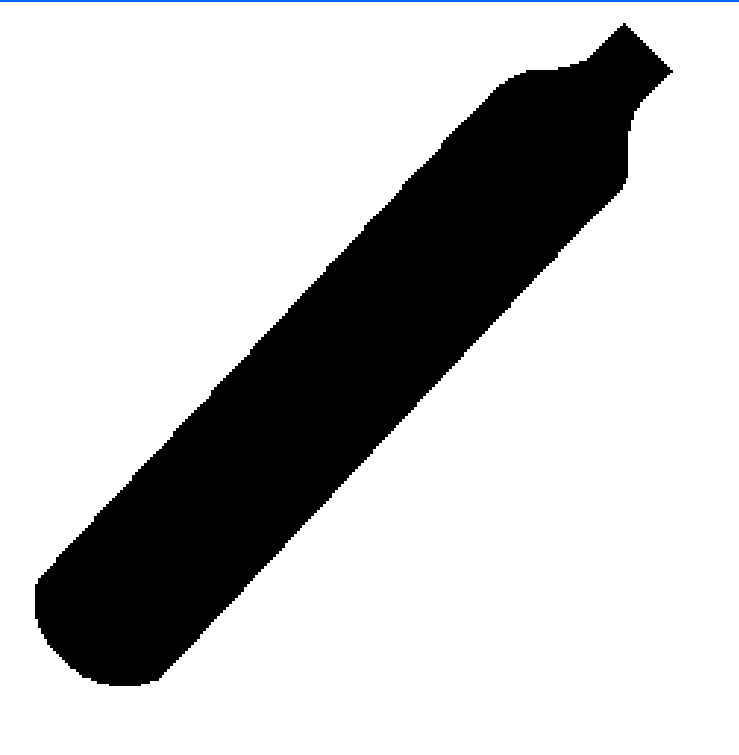
Quick Check

Which of the following material classes should use a Flaming "O" symbol?

1. Organic Peroxides
2. Flammables
3. Water Reactives
4. Acids

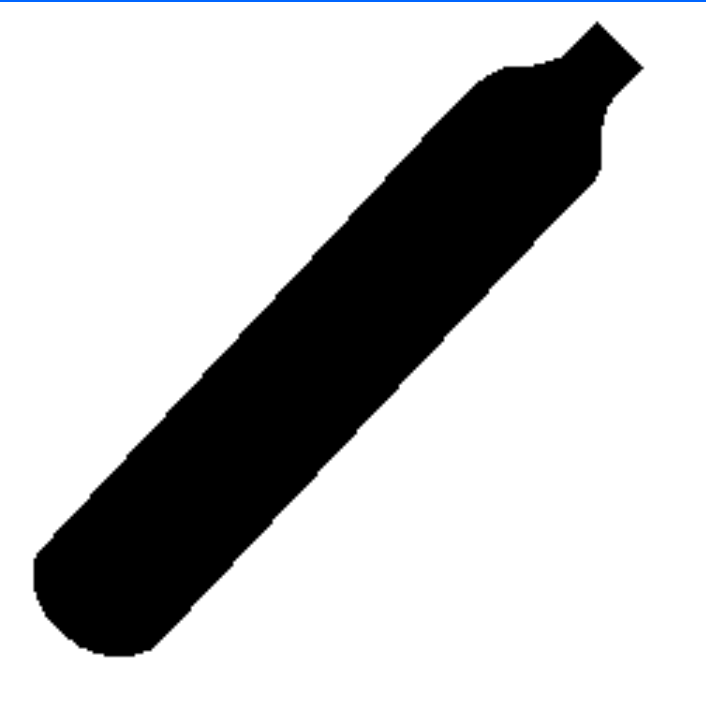


Materials That Use the Cylinder S



Many gases such as nitrogen, oxygen, and acetylene are used in the manufacturing process. In order to transport, store, and use these gases, they are "bottled" under pressure in tanks called gas cylinders.

Working with Materials That Use the Cylinder



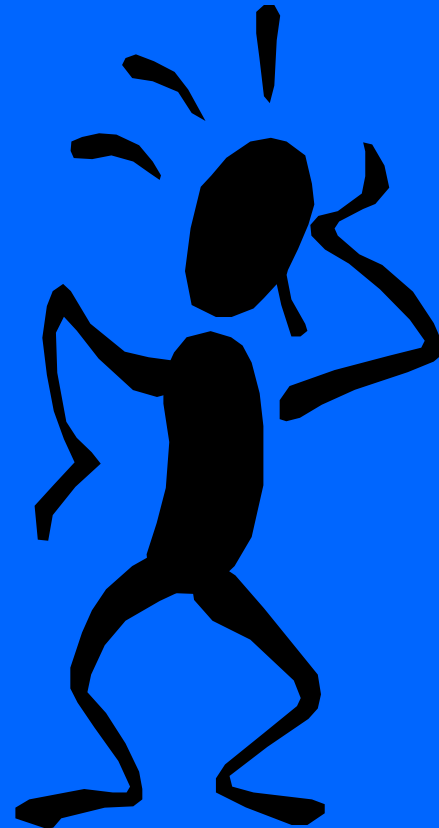
Great care should be taken when you handle gas cylinders to insure that they are not damaged when they are moved or used. In addition, you should read the warning label and the MSDS for safe handling procedures concerning the gas contained in a gas cylinder.

Quick Check

The gas in a gas cylinder is stored under great pressure.

1. True

2. False



**You have completed the Physical Hazards section of the
Hazard Communication course.**

Health Hazards

Health Hazards are one of two major classes of hazardous materials under the OSHA Communication Standard. The other major hazard class is Physical Hazards. In this session, we will be looking at various types of health hazard symbols you will need to know to use these materials safely. To help you identify materials with health hazards, the symbols shown below are often used.

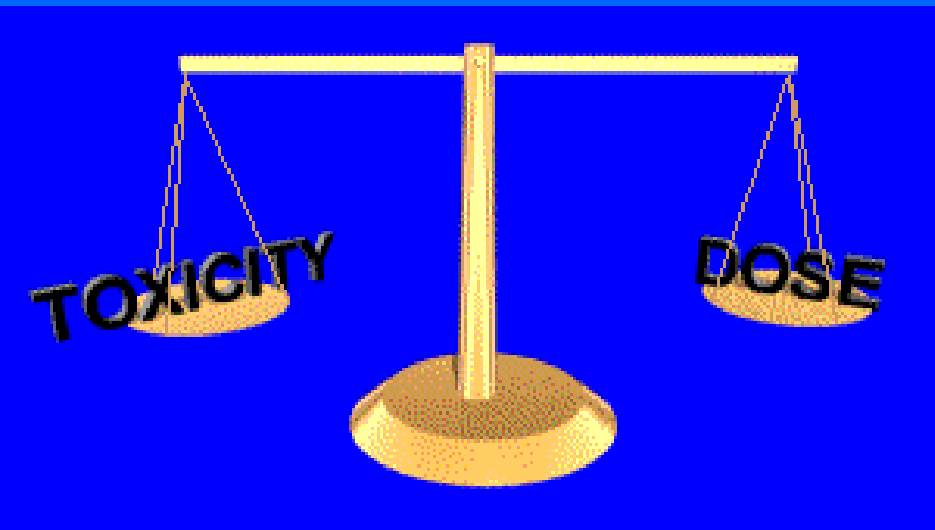


Toxicity vs. Hazard

The term toxicity is used to describe the ability of a substance to cause a harmful effect. EVERYTHING is toxic at some dose. Even water! If someone drinks too much water at any one time, it can cause death.



Toxicity vs. Dose



There is a balance between toxicity and dose. Dose is the AMOUNT of something you are exposed to or come in contact with. The less toxicity, the greater the dose you can tolerate without ill effects. The greater the toxicity, the less dose you can tolerate without becoming

Hazard Potential

Hazard Potential is the likelihood that a specific chemical or substance (or material) will cause an ill effect at a given dose. The following screen is used to understand the relationship between toxicity, dose, and hazard potential.

High Toxicity - Low Dose

For example, acetone is a highly toxic chemical. But you could work with it if you were outside or in a well ventilated room where your dose would be low. As the chart below shows, your hazard potential for working with acetone in a well ventilated room would be low.

| TOXICITY | Very Low | Low | Moderate | High | Very High |
|------------------|----------|-----|----------|------|-----------|
| HAZARD POTENTIAL | Very Low | Low | Moderate | High | Very High |
| DOSE | Very Low | Low | Moderate | High | Very High |

Low Toxicity - High Dose

Let's take another example. Nitrogen gas has a low toxic rating. It is in small amounts in the air we breathe. However, if you were in a confined space with only nitrogen gas in it (a very high dose), you would soon die because there is no oxygen. As the chart below indicates, your hazard potential for working in a space filled with nitrogen would be high.

| TOXICITY | Very Low | Low | Moderate | High | Very High |
|------------------|----------|-----|----------|------|-----------|
| HAZARD POTENTIAL | Very Low | Low | Moderate | High | Very High |
| DOSE | Very Low | Low | Moderate | High | Very High |

The Most Accurate Way

Hazard potential is the most accurate way to rate how dangerous a material is when used under a given set of circumstances. Neither the toxicity or flammability alone provides you with enough information on how to use a hazardous material safely. Your real concern must always be with a hazardous material's hazard potential.

Quick Check

Dose is the only factor that determines how a substance might affect you.

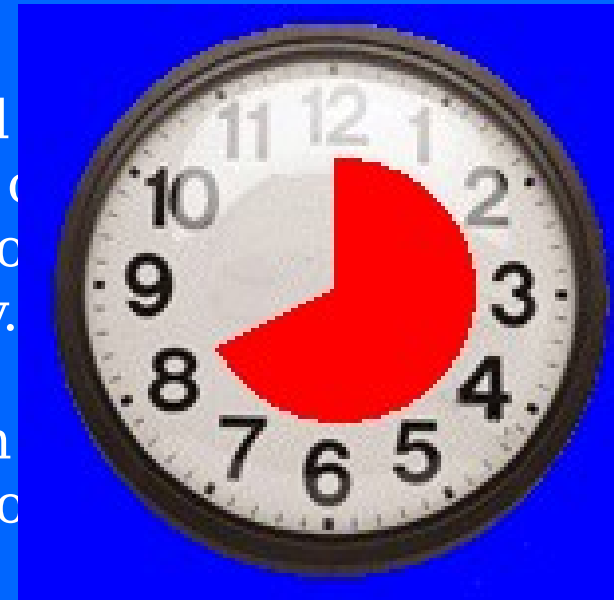
1. True
2. False

Safe Exposure Limits

Much research has been done by government agencies and groups to establish safe exposure limits for the chemicals used in your work area.

These limits are based upon a Time Weighted TWA. TWAs have been established for all the chemicals you work with and limit the average amount of exposure you can be exposed to over an eight hour day.

Within the facility, materials which are health hazards are monitored on a regular basis to insure that no one is overexposed.



Quick Check

TWA is the average amount of a chemical a person can be exposed to over an eight-hour day.

1. True

2. False

Acute vs. Chronic

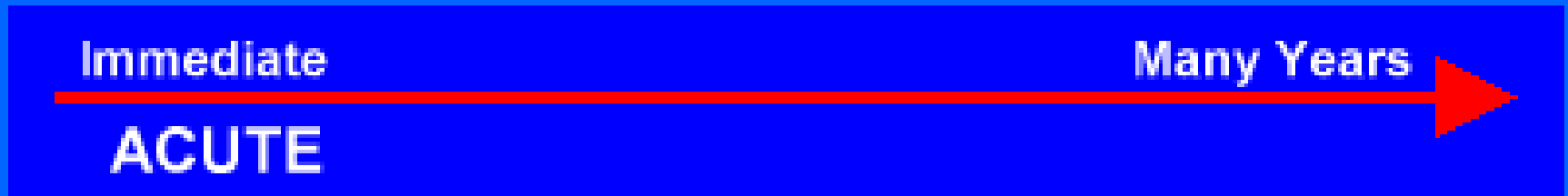
The effects of health hazards are classified as either

1. Acute
2. Chronic

Acute Health Hazards

Acute Health Hazards are those whose effects occur immediately or come in contact with them.

For example, you accidentally spill a strong acid on your hand. The acid burns your hand immediately. Or, you begin to work with a paint solvent in a closed area, and the fumes make you feel dizzy.



Chronic Health Hazards

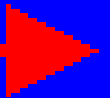
Chronic Health Hazards, on the other hand, are those whose effects take decades to occur after many exposures.

An example of a chronic health hazard would be asbestos. The dangers for people who have been overexposed to asbestos take years to appear. Asbestos has been linked to a number of fatal lung diseases.

Immediate

Many Years

CHRONIC



Quick Check

Chronic effects develop after many years and repeated overexposure

1. True

2. False

Routes of Exposure

It's important to remember that hazardous materials present a health hazard when they come into contact with the body. Chemicals can enter the body in three ways:

1. Inhalation
2. Skin
absorption
3. Ingestion

Inhalation

Inhalation is the most common route of exposure to most health hazards. This includes breathing dusts, fumes, oil mist, and vapors from solvents and gases.



Quick Check

The most common route of exposure in industrial application is

1. Inhalation
2. Absorption
3. Ingestion

Skin Contact



Some chemicals are absorbed into the body through skin contact. If a chemical is readily absorbed into the body, then the notation "skin" will appear along with the occupational exposure limits on the MSDS. Certain chemicals can cause burns and tissue destruction, so care must be taken to prevent skin and eye contact with these chemicals. This is why wearing aprons, gloves, eye protection, and other protective clothing is important when working with some chemicals.

Ingestion



It is possible to accidentally eat chemicals that are health hazards. To insure that you do not accidentally eat any of the chemicals you work with:

1. Never eat foods in areas where chemicals are used.
2. Never smoke in areas where chemicals are used.
3. Wash your hands and face with soap and water after working with chemicals before you eat, drink, or smoke.

Quick Check

The three ways a chemical can enter the body are ingestion, skin absorption, and inhalation.

1. True

2. False

Major Types of Health Hazards

Any chemical that may be harmful to your health is called a health hazard. The following is a brief description of the major types of health hazards.

Corrosives - cause tissue damage and burns on contact with the skin or eyes.

Primary Irritants - cause intense redness or swelling of the skin or eyes, but with no permanent tissue damage.

Sensitizers - cause an allergic skin or lung reaction.

Acutely Toxic Materials - cause an adverse effect, even at a very low dose.

Carcinogens - may cause cancer.

Teratogens - may cause birth defects.

Organ Specific Hazards - may cause damage to specific organ systems, such as the blood, liver, lungs, or reproductive system.

Quick Check

Which of the following is NOT a health hazard?

1. Primary Irritant
2. Combustible
3. Organ Specific Hazard

Health Hazard Symbols

The Medical symbol is a general symbol used to identify materials which are health hazards.



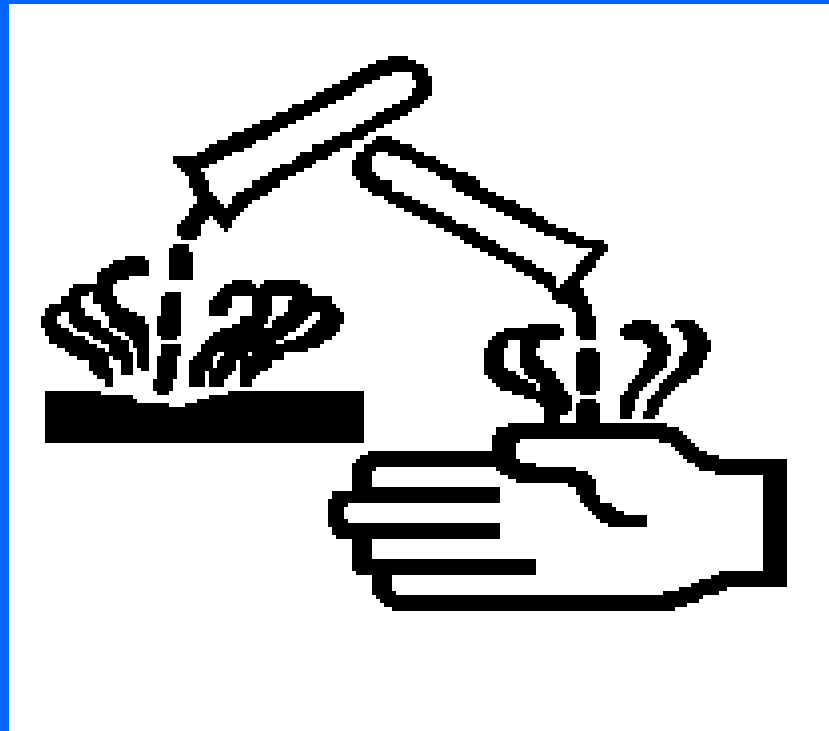
Health Hazard Symbols

The Skull and Crossbones is a symbol that has been used for centuries. Today it is used to identify hazardous materials which are poisonous.



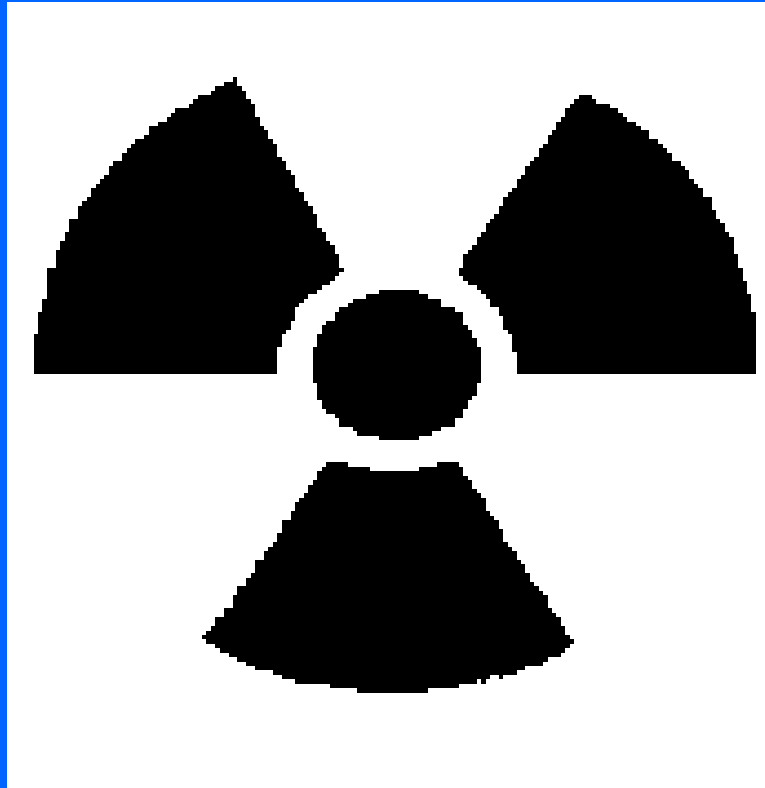
Health Hazard Symbols

This symbol is used to identify materials which are Corrosives. Corrosives cause tissue damage and burns on contact with skin or eyes.



Health Hazard Symbols

This symbol is used to identify materials which are Radioactive.



Health Hazard Symbols

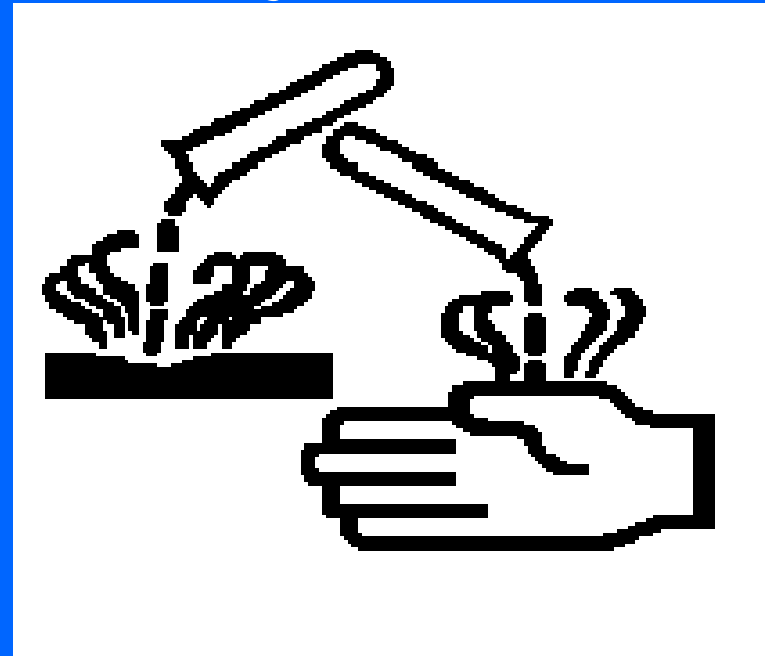
This symbol is used to identify hazardous Biological materials.



Quick Check

The symbol on the right is used to identify:

1. Corrosives
2. Radioactive Materials
3. Explosives
4. Biological Materials



Working with Health Hazards

As with materials that are physical hazards, be sure to read all warnings on the MSDSs that provide information concerning the health hazards you are working with.

**You have completed the Health Hazards section of the
Hazard Communication course.**

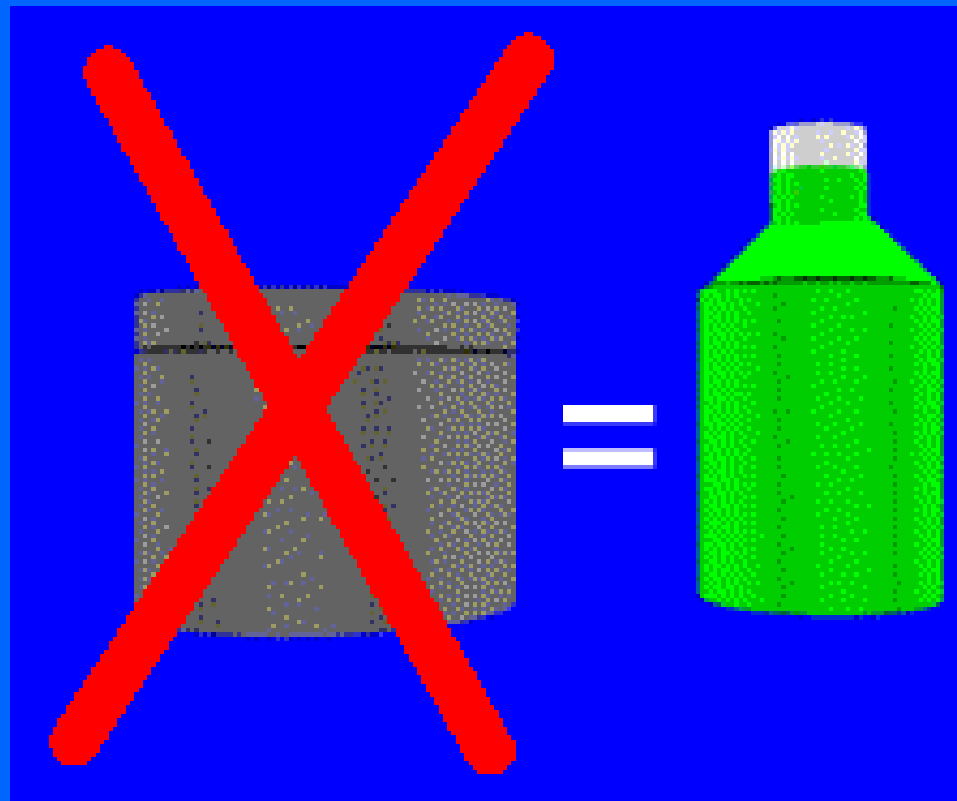
Controlling Physical and Health Hazards

There are a number of ways that you can safeguard your health and safety when using hazardous materials. These measures include:

- * **Product Substitution**
- * **Engineering Controls**
- * **Safe Work Practices**
- * **Personal Protective Equipment**
- * **Training and Communication**
- * **Environmental Monitoring**
- * **Personal Monitoring**

Product Substitution

Because many chemicals do similar jobs, it is important to select the right chemical for the good job, while being less toxic.



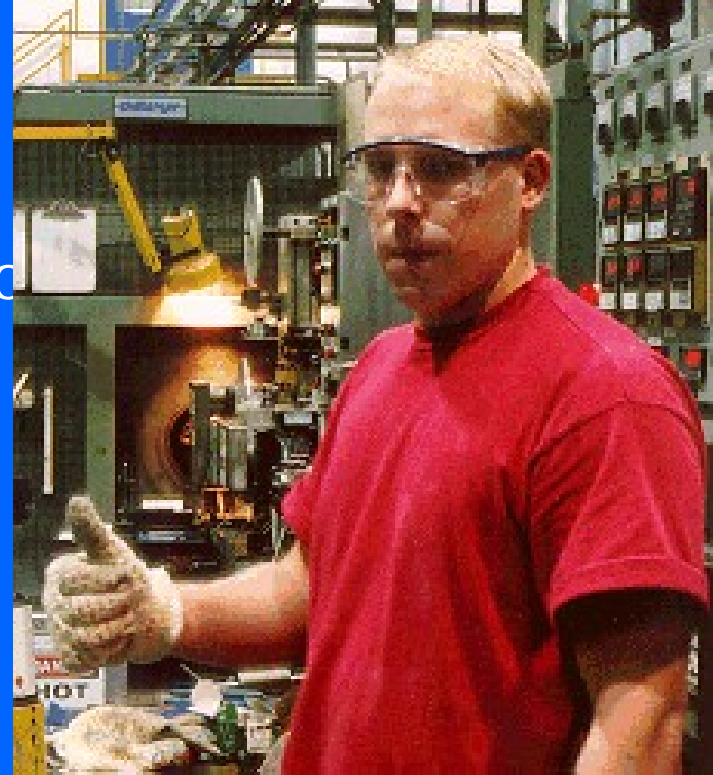
Engineering Controls

Well designed work areas minimize exposure to materials which are hazardous. Examples of engineering controls would include enclosure systems and wetting systems to control



Safe Work Practices

Safe work practices will insure that o
are used correctly and safely.



Personal Protective Equip

Masks, eye protection, gloves, apron
other protective equipment and clothing
designed to protect you while you work.
USE THEM!



Training and Communicat

Knowing how to work safely with chemicals that pose a hazard is an important aspect of training. This is the reason for this training, bulletin board, the plant, safety meetings, MSDSs, and safety bulletins. You have a right to know, but you also have a responsibility to use the knowledge and skills to work safely.



Environmental Monitoring

Industrial hygiene personnel regularly sample air and collect other samples to insure that hazardous chemicals do not exceed established acceptable exposure limits.



Personal Monitoring

Monitor yourself and others. Be on the lookout for any physical symptoms which would indicate that you or coworkers have been overexposed to any hazardous chemical. Symptoms, such as skin rashes, dizziness, throat irritations or strong odors, should be reported to your supervisor.



Quick Check

What protective measures will insure that safe exposure limits are

1. Product Substitution
2. Safe Work Practices
3. Training and Communication
4. All of the above

**You have completed the Protective Measures
Hazard Communication course.**

